



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------|-------------|----------------------|---------------------|------------------|
| 09/701,682 | 02/06/2001 | Agostino Piccirillo | 3606-0108P | 8003 |
| 2292 | 7590 | 12/29/2004 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH | | | CHANG, EDITH M | |
| PO BOX 747 | | | | |
| FALLS CHURCH, VA 22040-0747 | | | ART UNIT | PAPER NUMBER |
| | | | 2637 | |

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|--|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/701,682 | PICCIRIELLO ET AL. <i>[Signature]</i> |
| | Examiner | Art Unit |
| | Edith M Chang | 2637 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 27 August 2004.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-16 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-16 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on Aug 27 2004 & Feb 06 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Hence, in page 7, the article "Adaptive Filter Theory" by S.Haykin, published by Prentice-Hall, Inc., Englewood Cliffs, N.J., 1991; in page 8, the article "Analysis of subspace fitting based methods for sensor array processing" by B. Ottersen and M. Viberg, following the Proc. ICASSP 89, pp.2807-2810, Glasgow, Scotland, May 1989; in page 9, the two articles by J.H. Winers; in page 11, "Adaptive Antenna Systems" by B. Widrow, P.E. Mantey, L.J. Griffiths and BB. B. Goode; in page WO 97 08849 A; in page 17, DE-A-19639414; in page 33, "Generalized Displacement Structure for Block-Toeplitz, Toeplitz-Block, and Toeplitz-derived Matrices" by J. Chun and T. Kailath and "Numerical Linear Algebra Digital Signal Processing and Parallel Algorithms" by G.H. Golub and P Van Dooren; in page 43, "Per-survivor processing: a general approach to MLSE in uncertain environments" by R. Raheli, A. Polydoros and C.K. Tzou; in page 50, "Time-Variant Displacement Structure and Triangular Arrays" by A. H. Sayed, H. Lev-Ari and T. Kailath; and in page 51, "Fast Computation of Channel-Estimate Based Equalizers in Packet Data Transmission" by N. Al-Dhahir, J.M. Cioffi, "A

Art Unit: 2637

Computationally Efficient FIR MMSE-DFE for CCI-Impaired Dispersive Channels" by N. Al-Dahir, have not been considered.

Drawings

2. Figure 1 to figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. For the formality of the application under the present office practice, applicant(s) is required to replace "Claims" with "I or We Claim", "The Invention Claimed Is" (or the equivalent) before the Claims part of the specification of the instant application. See MPEP 608.01(m).

Claim Objections

4. Claims 1-16 are objected to because of the following informalities:

Claim 1, line 1: "Equalization" is suggested changing to "An equalization"; line 10: "of signals coming" is suggested changing to "signals received"; line 18: "the" is suggested changing to "a"; line 22: "optimization of" is suggested changing to "optimizing"; line 26: "a" is suggested changing to "a matched"; line 33: "the optimized" is suggested changing to "optimized"; line 35: "..." is suggested changing to "to", "replacing the" is suggested changing to "replacing"; line 43-44 "the all duration" is suggested changing to "the duration"; line 45: "the rejection" is suggested changing to "a rejection"; line 48: "at the" is suggested changing to "at".

Claim 2, line 1: "Equalization" is suggested changing to "The equalization"; line 3: "preceding step" is suggested changing to "step"; line 5: "calculation" is suggested changing to "calculating"; line 6: "coming" is suggested changing to "received", "of the" is suggested changing to "of"; line 8: "the Schur" is suggested changing to "a Schur"; line 11: "estimation of" is suggested changing to "estimating", "of matrix" is suggested changing to "of Schur complement matrix"; line 12: "the minimum" is suggested changing to "a minimum"; line 14: "estimation of" is suggested changing to "estimating".

Claim 3, line 1: "Equalization" is suggested changing to "The equalization"; line 3: "preceding step" is suggested changing to "step"; line 5: "calculation" is suggested changing to "calculating"; line 6: "coming" is suggested changing to "received"; line 10: "the samples" is suggested changing to "samples"; line 14: "estimation of" is suggested changing to "estimating"

Claim 4: line 1: "Equalization" is suggested changing to "The equalization"; line 3: "preceding step" is suggested changing to "step"; lines 5, 10 & 13: "assignment of" is suggested changing to "assigning"; line 11: "the optimized" is suggested changing to "optimized"; line 16: "of said" is suggested changing to "said", "matrix" is suggested changing

Art Unit: 2637

to “triangular matrix”; line 21: “at instant” is suggested changing to “at the instant”; line 24: “of” is suggested changing to “of bursts of”, “or” is suggested changing to “or said low delay”; line 31: “determination of” is suggested changing to “determining”, “the following” is suggested changing to “the”; line 33: “vector of” is suggested changing to “vector storing”.

Claim 5, line 1: “Equalization” is suggested changing to “The equalization”.

Claim 6, line 1: ““Equalization” is suggested changing to “The equalization”; line 2: “matrix” is suggested changing to “structured triangular matrix”.

Claim 7, line 1: “Adaptive equalization” is suggested changing to “The equalization”; line 3: “preceding step” is suggested changing to “step”; line 10: “matrix” is suggested changing to “sole triangular matrix”; lines 10-11: “the samples of signals on ” is suggested changing to “samples of received signals from”; line 12: “matrix” is suggested changing to “the sole triangular matrix”; line 15: “updating of” is suggested changing to “updating”.

Claim 8, line 1: “Equalization” is suggested changing to “The equalization”; line 5: “said” is suggested changing to “said structured”, “matrix” is suggested changing to “the sole triangular matrix”.

Claim 9, line 1: “Equalization” is suggested changing to “The equalization”; line 2: “matrix” is suggested changing to “structured triangular matrix”.

Claim 10, line 1: “Equalization” is suggested changing to “The equalization”; line 3: “low” is suggested changing to “ said low”, and lines 6-7 “estimate of” is suggested changing to “estimating” .

Art Unit: 2637

Claim 11, line 1: "Equalization" is suggested changing to "The equalization"; line 3: "in a" is suggested changing to "in the"; lines 3-4: "equalization of the step" is suggested changing to "step"; line 6: "the second" is suggested changing to "a second".

Claim 12, line 1: "Equalizer" is suggested changing to "An equalizer"; line 4: "a" is suggested changing to "the"; lines 43 & 46: "threshold" is suggested changing to "the given threshold"; and line 51: "at the" is suggested changing to "at"; line 52: "the preceding means" is suggested changing to "means".

Claims 13-16, line 1: "Equalizer" is suggested changing to "The equalizer".

Claim 13, line 8: "coming" is suggested changing to "received"; line 9: "said" is suggested changing to "said algebraic"; lines 10-11: "estimated low delay ones" is suggested changing to "low delay estimated sequence".

Claim 15, line 8: "coming" is suggested changing to "received"; line 9: "vector" is suggested changing to "algebraic vector";

Claim 16, lines 5 & 18: "matrix" is suggested changing to "triangular matrix"; line 6: "including the" is suggested changing to "including".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 2637

6. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 6: "the receiver", lines 6-7 & 16-17: "the impulse response of the transmission channel" lack antecedent bases; line 11: "them" does not clearly indicate what are "them"; line 12: "the basis" lacks antecedent basis; lines 22 & 33: "said weights and samples" lacks antecedent basis, does it mean the "a sequence of weights" recited in line 13 and the "a sequence of samples" recited in line 16 or other "weights and samples"; line 25: "the signal" lacks antecedent basis; line 34: "the time slot" lacks antecedent basis; line 37: "said equalization adaptive" lacks antecedent basis; line 46: "the sole weights" lacks antecedent basis; line 42: "the samples of the impulse response" lacks antecedent .

Claim 3, lines 12-13: "each instant n-th of the transient" lacks antecedent basis; lines 16-17: "the samples of the impulse response at the instant n" lacks antecedent basis.

Claim 4, line 12: "the impulse response of the transmission channel" lacks antecedent basis; line 14: "said weights" does not clearly indicate which weights of the spatial filter in line 13 of claim 1; lines 25-26: "the impulse response" lacks antecedent basis; line 34: "the optimum weight vector" lacks antecedent basis.

Claim 5, line 6: "the starting equation" and line 7: "the relevant calculation" lacks antecedent bases.

Claim 7, lines 24-25 & 32: "the impulse response" and line 30: "the optimum weight vector" lack antecedent bases.

Claim 8, line 3 “the generic” and lines 6-7: “ the values of index i” lack antecedent bases.

Claim 10, line 3: “said vector”, line 5: “the trellis”, line 6: “this”, “the propagation of errors”, and line 7: “said optimum weights and channel impulse response samples” lack antecedent bases.

Claim 11, line 5: “the burst” lacks antecedent basis; line 6: “it” does not clearly indicate that what is the “it”.

Claim 12, line 7: “the receiver”, lines 7-8 & 16-17: “the impulse response of the transmission channel” lack antecedent bases; line 12: “them” does not clearly indicate what are “them”; line 13: “the basis” lacks antecedent basis; line 23: “said weights and samples” lacks antecedent basis, does it mean the “a sequence of weights” recited in line 13 and the “a sequence of samples” recited in line 16 or other “weights and samples”; line 25: “the signal” lacks antecedent basis; line 31: “the time slot” lacks antecedent basis; lines 33-34: “said equalization adaptive” lacks antecedent basis; line 41-42: “the selection of means” lacks antecedent basis and it does not clearly indicate that it is a means or a selection; line 42-43: “the joint optimization of weights and samples” lacks antecedent basis; line 47: “the midamble” lacks antecedent basis, “the latter means” does not clearly indicate which means; lines 49-50: “the sole weights.

Claim 13, line 12: “the length of the channel impulse response”, lines 19-20: “the optimized samples of the impulse response”, lines 23-24: “the optimized weights” lack antecedent bases.

Claim 14, lines 4-5: “the upstream array”, lines 5-6: “the previous vector”, line 6: “the downstream array” lack antecedent bases.

Art Unit: 2637

Claim 15, line 12: "the length of the channel impulse response" lacks antecedent basis, line 19-20: "the first" does not clearly indicate the first of what: a delay or a systolic array; line 21: "the samples of the impulse response", lines 22-23: "the optimized weights" lack antecedent bases.

Claim 16, line 3: "the order indicated", "the cells"; line 10: "the arrow"; line 18: "the alternative calculation means" lack antecedent bases.

Claims 2, 6 and 9 are dependent on rejected claim 1.

Allowable Subject Matter

7. Claims 1-16 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not teach or suggest, alone or in a combination, among other things, at least an equalizer and its method for the cancellation of isofrequential interferers in signals received by array antennas of base stations of a cellular mobile system as a whole, the combination of elements and features as claimed, which includes: calculating a square error between the corresponding n-th samples of the estimate impulse response and the beamformed received sequence; joint optimization of the weights and samples and a modified joint optimization step for all duration starting from the instant n up to an instant $n+\Delta T$ of a transient devoted to the rejection of strong interferent outside a midamble.

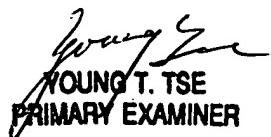
Art Unit: 2637

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
December 23, 2004


YOUNG T. TSE
PRIMARY EXAMINER